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10/524,606	08/02/2005	Jinyan Li	54384/DBP/C982	4851

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EXAMINER
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BROWN JR, NATHAN H

ART UNIT	PAPER NUMBER
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2121

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/524,606

Applicant(s)

LI, JINYAN

Examiner

Nathan H. Brown, Jr.

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE (3) MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 76-89 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 76,82,83 and 89 is/are rejected.
- 7) ☒ Claim(s) 77-81 and 84-88 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## Examiner's Detailed Office Action

1. This Office is responsive to application 10/524,606, filed 12/13/07.
2. Claims 76-89 are pending. Claims 76-89 are currently new. Claims 1-75 are cancelled.
3. After the previous office action, claims 1-46 and 57-67 stood rejected.

## Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 76 is rejected under 35 U.S.C. 102(b) as being anticipated by *Li et al. (Li)*, "Identifying Good Diagnostic Gene Groups from Gene Expression Profiles Using the Concept of Emerging Patterns", 2002.

Regarding claim 76. (New) *Li* teaches in a training data set D containing gene expression data for a plurality of genes derived from a normal cell group including a plurality of normal cells and a diseased cell group including a plurality of diseased cells associated with a disease (*see* p. 10, para. 2, “We thus established a SVM model using original data from the 62 (22 normal plus 40 cancer) cells as training data.”), a method for determining a plurality of emerging patterns within the gene expression data (*see* p. 4, full para. 1), wherein said emerging patterns are configured to be used to test cells from a test sample for the presence of the disease (*see* p. 11, §RESULTS ON THE ALL/AML DATASET, “866 of the 7129 features in the 38 training data are partitioned into two or three intervals...”), the method comprising the steps of:

determining a plurality of emerging patterns from the training data set D, wherein each of said emerging patterns comprises at least one condition based on a fixed range of said gene expression data for at least one of said plurality of genes, and wherein a plurality of occurrences in one of said normal cell group and diseased cell group satisfies said at least one condition, but no occurrence in the other one of said normal cell group and diseased cell group satisfies said at least one condition (*see* pp. 11, §RESULTS ON THE ALL/AML DATASET, “the two intervals associated with Zyxin form two EPs, each having 100% frequency in the two classes. We also found many other EPs with 100% frequency. All of these EPs with 100% frequency are arbitrators to distinguish ALL and AML samples.”); and

creating two lists, wherein a first list of said two lists contains a frequency of occurrence,  $f_1(m)$ , of each emerging pattern  $EP_1(m)$  from said plurality of emerging patterns that has a non-zero occurrence in data associated with said normal cells, and a second list of said two lists

contains a frequency of occurrence,  $f_2(m)$ , of each emerging pattern  $EP_2(m)$  from said plurality of emerging patterns that has a non-zero occurrence in data associated with said diseased cells, wherein said two lists each provide a plurality of emerging patterns configured to be used as a diagnostic tool to determine whether the cells from the test sample are normal or diseased (*see p. 3, para. 2, "...changes its frequency of 0% in normal tissues to a frequency of 75% in cancer tissues."*).

6. Claims 83 and 89 are rejected under 35 U.S.C. 102(a) as being anticipated by *Dong et al. (Dong)*, "Mining border descriptions of emerging patterns from dataset pairs", 2004.

Regarding claim 83. (New) *Dong* teaches a system for determining a plurality of emerging patterns within a training data set D containing gene expression data for a plurality of genes derived from a normal cell group including a plurality of normal cells and a diseased cell group including a plurality of diseased cells associated with a disease, wherein said emerging patterns are configured to be used to test cells from a test sample for the presence of the disease (*see pp. 178-179, §1. Introduction, "EP approach can capture patterns with relatively low support, especially for applications where discrimination signals of high support are rare. Such patterns are also useful for constructing good classifiers."*, *Examiner interprets example data sets as training data sets. Examiner interprets "classifiers" as emerging patterns configured to be used to test cells from a test sample for the presence of the disease.*), the system (*see p. 192, "The experiments were performed on an AMD Althon 450Mhz system..."*) comprising of:

at least one memory (*see* p. 192, “256MB of main memory”),

at least one processor (*see* p. 192, “AMD Althon 450Mhz”), and

at least one user interface (*see* p. 192, Examiner interprets an “AMD Althon 450Mhz system” to be a PC comprising at least one user interface for user control.),

all of which are connected to one another by at least one bus (*see* p. 192, Examiner interprets an “AMD Althon 450Mhz system” to be a PC comprising at least one bus to connect the processor, main memory, and the hard disk.);

wherein said at least one processor is configured to:

access the gene expression data within the training data set D (*see* pp. 196-7, 6.3. §Experiments on microarray gene expression data);

determine a plurality of emerging patterns from the training data set D, wherein each of said emerging patterns comprises at least one condition based on a fixed range of said gene expression data for at least one of said plurality of genes, and wherein a plurality of occurrences satisfies said at least one condition for one of said normal cell group and diseased cell group, but no occurrence satisfies said at least one condition for the other one of said normal cell group and diseased cell group (*see* pp. 181-2, Example 2.3., *Examiner interprets example data sets as training data sets.*); and

create two lists, wherein a first list of said two lists contains a frequency of occurrence,  $f_1(m)$ , of each emerging pattern  $EP_1(m)$  from said plurality of emerging

patterns that has a non-zero occurrence in data associated with said normal cells, and a second list of said two lists contains a frequency of occurrence,  $f_2(m)$ , of each emerging pattern  $EP_2(m)$  from said plurality of emerging patterns that has a non-zero occurrence in data associated with said diseased cells (*see* pp. 181-2, Example 2.3.),

wherein said two lists each provide a plurality of emerging patterns configured to be used as a diagnostic tool to determine whether the cells from the test sample are normal or diseased (*see* pp. 182, Example 2.3., “More interpretation of these EPs for biomedical purposes can be found in our early work (Li and Wong 2002b), where EPs have been used for building an accurate classifier for the diagnosis of this disease and for the planning of a treatment therapy for curing this disease.”).

Regarding claim 89. (New) Dong teaches the method of claim 86, wherein said emerging patterns are jumping emerging patterns (*see* p. 180, Definition 2.1).

### Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Dong.

Regarding claim 82. (New) *Li* teaches the method of claim 79. *Li* does not teach said emerging patterns are jumping emerging patterns. However, *Dong* does teach said emerging patterns are jumping emerging patterns (see p. 180, Definition 2.1). It would have been obvious at the time the invention was made to persons having ordinary skill in the art to combine *Li* with *Dong* to build accurate classifiers and perform mining of multifactor interactions.

### Response to Arguments

9. Applicant's arguments, filed December 13, 2007, with respect to the rejection of claims 1-46 under 35 U.S.C. 101 have been fully considered and are persuasive. The rejection of claims 1-46 under 35 U.S.C. 101 has been withdrawn.

10. Applicant's arguments, filed December 13, 2007, with respect to the rejection of claims 1, 11, and 67 under 35 U.S.C. 102 and 103 are moot due to new grounds of rejection.


### Allowable Subject Matter

11. Claims 77-81 and 84-88 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



## Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan H. Brown, Jr. whose telephone number is 571-272- 8632. The examiner can normally be reached on M-F 0830-1700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
David Vincent  
Supervisory Patent Examiner  
Tech Center 2100

Nathan H. Brown, Jr.  
January 22, 2008